

APPENDIX V

POLLUTANTS OF CONCERN

Pollutant Impa	cts on Water Quality						
Sediment	Sediment is a common component of stormwater, and can be a pollutant. Sediment can detrimental to aquatic life (primary producers, benthic invertebrates, and fish) by interfer with photosynthesis, respiration, growth, reproduction, and oxygen exchange in water bodies. Sediment can transport other pollutants that are attached to it including nutrients trace metals, and hydrocarbons. Sediment is the primary component of total suspended solids (TSS), a common water quality analytical parameter.						
Nutrients	Nutrients including nitrogen and phosphorous are the major plant nutrients used for fertilizing landscapes, and are often found in stormwater. These nutrients can result in excessive or accelerated growth of vegetation, such as algae, resulting in impaired use of water in lakes and other sources of water supply. For example, nutrients have led to a loss of water clarity in Lake Tahoe. In addition, un-ionized ammonia (one of the nitrogen forms) can be toxic to fish.						
Bacteria and Viruses	Bacteria and viruses are common contaminates of stormwater. For separate storm drain systems, sources of these contaminants include animal excrement and sanitary sewer overflow. High levels of indicator bacteria in stormwater have led to the closure of beaches, lakes, and rivers to contact recreation such as swimming.						
Oil and Grease	Oil and grease includes a wide array of hydrocarbon compounds, some of which are toxic to aquatic organisms at low concentrations. Sources of oil and grease include leakage, spills, cleaning and sloughing associated with vehicle and equipment engines and suspensions, leaking and breaks in hydraulic systems, restaurants, and waste oil disposal.						
Metals	Metals including lead, zinc, cadmium, copper, chromium, and nickel are commonly found in stormwater. Many of the artificial surfaces of the urban environment (e.g., galvanized metal, paint, automobiles, or preserved wood) contain metals, which enter stormwater as the surfaces corrode, flake, dissolve, decay, or leach. Over half the trace metal load carried in stormwater is associated with sediments. Metals are of concern because they are toxic to aquatic organisms, can bioaccumulate (accumulate to toxic levels in aquatic animals such as fish), and have the potential to contaminate drinking water supplies.						
Organics	Organics may be found in stormwater at low concentrations. Often synthetic organic compounds (adhesives, cleaners, sealants, solvents, etc.) are widely applied and may be improperly stored and disposed. In addition, deliberate dumping of these chemicals into storm drains and inlets causes environmental harm to waterways.						
Pesticides	Pesticides (including herbicides, fungicides, rodenticides, and insecticides) have been repeatedly detected in stormwater at toxic levels, even when pesticides have been applied in accordance with label instructions. As pesticide use has increased, so too have concerns about the adverse effects of pesticides on the environment and human health. Accumulation of these compounds in simple aquatic organisms, such as plankton, provides an avenue for biomagnification through the food web, potentially resulting in elevated levels of toxins in organisms that feed on them, such as fish and birds.						
Gross Pollutants	Gross Pollutants (trash, debris and floatables) may include heavy metals, pesticides, and bacteria in stormwater. Typically resulting from an urban environment, industrial sites and construction sites, trash and floatables may create an aesthetic "eye sore" in waterways. Gross pollutants also include plant debris (such as leaves and lawn-clippings from landscape maintenance), animal excrement, street litter, and other organic matter. Such substances may harbor bacteria, viruses, vectors, and depress the dissolved oxygen levels in streams, lakes and estuaries sometimes causing fish kills.						
Vector Production	Vector production (e.g., mosquitoes, flies, and rodents) is frequently associated with sheltered habitats and standing water. Unless designed and maintained properly, standing water may occur in treatment control BMP's for 72 hours or more, thus providing a source for vector habitat and reproduction (Metzger, 2002).						

Source: California Stormwater Quality Association, Stormwater BMP Handbook, 2003.

Potential pollutants likely associated with specific *municipal facilities*

	Potential Pollutants								
Municipality Facility Activity	Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances
Building and Grounds Maintenance and Repair		Х	Х	Х	Х	Х	Х	Х	Х
Parking/Storage Area Maintenance		Х	Х	Х	Х	Х	Х		Х
Waste Handling and Disposal		Х	Х	Х	Х	Х	Х	Х	Х
Vehicle and Equipment Fueling			Х	Х		Х	Х		
Vehicle and Equipment Maintenance and Repair				Х		Х	Х		
Vehicle and Equipment Washing and Steam Cleaning		Х	Х	Х		Х	Х		
Outdoor Loading and Unloading of Materials		Х	Х	Х		Х	Х	Х	Х
Outdoor Container Storage of Liquids		Х		Х		Х	Х	Х	Х
Outdoor Storage of Raw Materials	Х	Х	Х			Х	Х	Х	Х
Outdoor Process Equipment			Х	Х		Х	Х		
Overwater Activities			Х	Х	Х	Х	Х	Х	X
Landscape Maintenance		Х	Х		Х			Х	Х
Source: California Stormwater BMP Handbook (http://www.cabmphandbooks.com/)(slightly modified)									

Potential pollutants likely associated with *municipal activities*

		Potential Pollutants								
Municipal Program	Activities	Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances
Roads, Streets, and Highways Operation and Maintenance	Sweeping and Cleaning	Х		Х	Х		Х			Х
	Street Repair, Maintenance, and Striping/Painting	Х		Х	X		Х	Х		
	Bridge and Structure Maintenance	Х		Х	Х		Х	Х		
Plaza, Sidewalk, and	Surface Cleaning	Х	Х			Х	Х			Х
Parking Lot	Graffiti Cleaning	Х	Х		Х			Х		
Maintenance and	Sidewalk Repair	Х		Х						
Cleaning	Controlling Litter	Х		Х		Χ	Х			X
Fountains, Pools,	Fountain and Pool Draining		Х					Х		
Lakes, and Lagoons Maintenance	Lake and Lagoon Maintenance	Х	Х	Х		X			Х	X
	Mowing/Trimming/Planting	Х	Х	Х		Х			Х	Х
Landscape Maintenance	Fertilizer & Pesticide Management	X	X						X	
Lundscupe municentite	Managing Landscape Wastes			Х					Х	Х
	Erosion Control	X	X							
Drainage System Operation and Maintenance	Inspection and Cleaning of Stormwater Conveyance Structures	X	X	X		X		X		X
	Controlling Illicit Connections and Discharges	Х	Х	Х	Х	X	Х	Х	Х	X
	Controlling Illegal Dumping	Х	Х	Х	Х	Х	Х	Х	Х	Х
	Maintenance of Inlet and Outlet Structures	X		X	X		X			X
	Solid Waste Collection		Х	Х	Х	Х	Х	Х		X
Waste Handling and Disposal	Waste Reduction and Recycling			Х	X					X
	Household Hazardous Waste Collection			X	X		X	X	X	
	Controlling Litter			Х	Х	Х		Х		Х
	Controlling Illegal Dumping	Х		Х		Х	Х		Х	Х
Water and Sewer	Water Line Maintenance	Х				Х	Х			
Utility Operation and	Sanitary Sewer Maintenance	Х				Х	Х			Х
Maintenance	Spill/Leak/Overflow Control, Response, and Containment water BMP Handbook (http://www	Х	Х			Х		Х		Х

Source: California Stormwater BMP Handbook (http://www.cabmphandbooks.com/)